MISSOURI BO

PETER H

GEO

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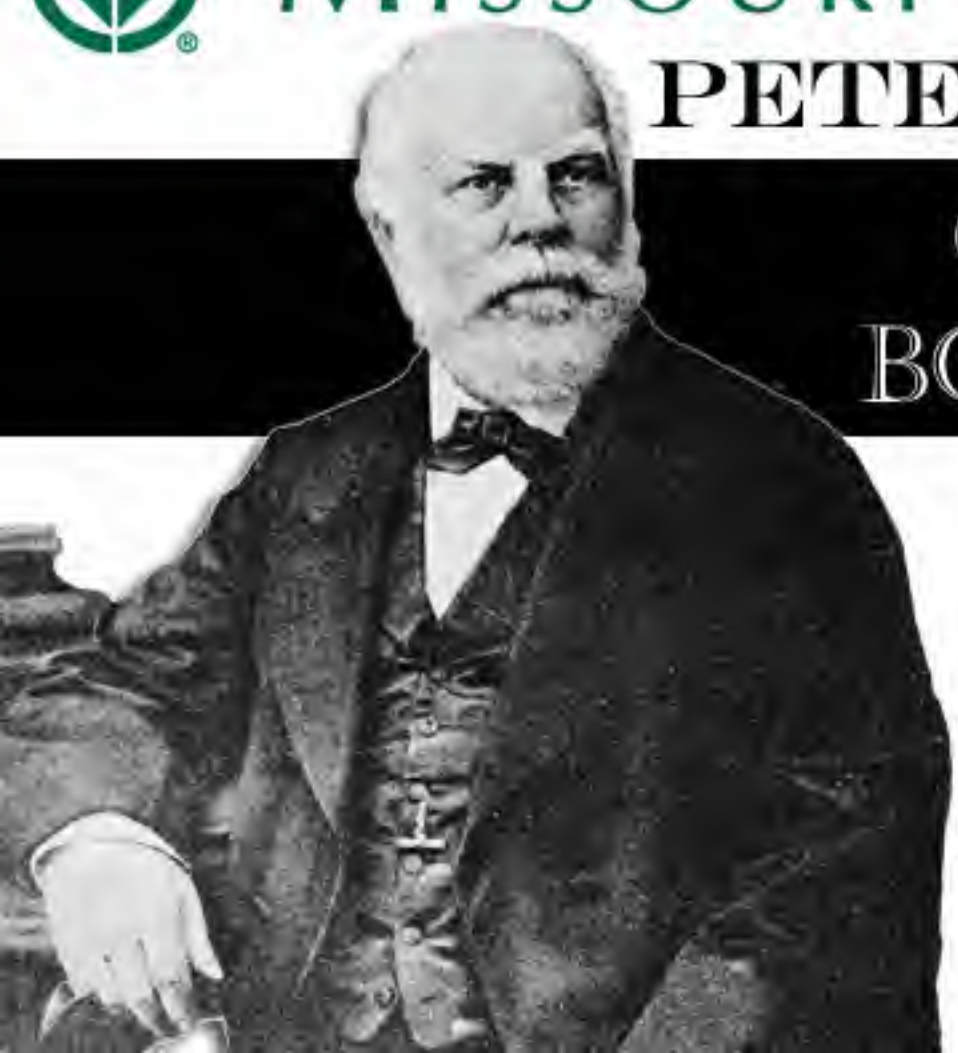

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Rec'd Nov 27th 1871
Ans same Day

Glens Falls Warren Co N Y
Nov 23d 1871

Dr Engelmann. Dear Sir.
Mr Wm H Leggett, with whom I
have been in Communication for
some time in regard to a parasite
of the "Abies nigra" has requested
me to write you what I know
of the plant. I was shown in April
last a mistletoe, parasitic on the
cedar of Nevada, and it at once
occurred to me that something
of the kind might cause the
distortion and decay of the N. Nigra
among the Adirondacks. My conjecture
proved to be true, for the first Abies
that I had an opportunity to examine
were literaly swarming with it
It was then very small and without
fruit. It grew, not in tufts,
but like the foliage scattered
all over the smaller branches
and twigs. The tree presented a
very unhealthy appearance.

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some branches thickend, others
unusualy long and twisted. Sheets
of fine twigs covered with their
foliage, grew here and there on
the almost naked limbs. I found
the plant in Warren Co on the edge
of a peat bog, in Essex Co in a
peat bog high up among the
mountains, and on the north side
of a high mountain densely covered
with small Spruces. I judge from
this that it may be found much
farther north than Northern New York
When I first found it I called it
mistletoe for want of another name
and because of its resemblance to
the Nevada Mistletoe. When after
a careful examination without
finding the flower I saw the cluster
of dark little seeds appear at the
apex of the last joint I was at loss
to give it a place For a time I thought
it a Cryptogam but on comparison
with the Nevada plant I felt sure
that it was of the Mistletoe order.
I think it is deciduous, falling with
the first frost or separating at the
joints, as I have been unable to
procure any by sending to the
person who saw me get the

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Am. Nov 27 1871

Glens Falls
Nov 23 1871

plaint that I found. I am glad
that Mr Peck was so fortunate
as to procure it, and the question
which puzzled me so long is so
well answered. If I can procure
some of the twigs of a tree infested
I will send them to you as it might
be possible to detect its process of
planting its seed, and its manner
of germinating in that way.

Very truly yours.

Mrs Lucy A Millington

Mrs Millington writes to Mr Leggett that some
of the plants were 1/2 inches high.

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Rec'd Dec 9th
Ans — 14

Glens Falls Warren Co N Y Dec 5th '71

Dr George Engelmann

Dear Sir

your letter I received in due season. I
regret that I am unable to send you
any of the parasitic plants I gathered last
year. I lost all of the first specimens by
entrusting them to a friend Then I formed
August 8th. I had thought it the last week
in July until I referred to my memoranda
The second lot I formed August 20th, and
the last specimens I got Sept 7th. All of
them were immature, but the best were
those of August 20th. My little nieces threw
them out of my window thinking them
rubbish of course. I picked up a few which
I sent with all of the last lot to Mr Leggett
I have returned to day from Waranesburgh
and will forward to you immediately by mail
some specimens that I got there. It was
rather an odd botanical excursion with
twelve inches of snow on the ground and
the thermometer in the neighborhood of zero
but I felt myself repaid by a walk of
several miles in that hilly and wooded
country. I explored the edge of the peat

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PS I am satisfied both by your assertion and my own observation that this plant <u>is not</u> an annual. The people to whom I wrote to procure it say that at the last of October all the large plants were gone but very minute ones appeared in their places. So their ignorance of botany they supposed it to be some thing else and wrote me there were none. I enclose a bit of the Nowada Mistletoe brought by Maj Clendon. My chances for watching the plants next year will I fear be limited as none of the Aloes are common with us but I will do what I can.

M.

will you be kind enough to tell me what is the best book for beginners in Cryptogamic Botany

boy over again, and cannot but wonder that this plant was never found before. I got specimens from at least 20 different trees At least half of all the trees, in that place are infected. and the remarkable appearance of the dead and dying trees should have called for a closer inspection than they seem to have got before. I am satisfied now that the little dark seeds I saw at the apex of the ripened seeds escaped from the natural opening, but were still firmly adherent to the central core, or placenta, that was expelled with them. I did not discover the differnce in the plants, perhaps because I found only female plants. I hope them are both male and female in them I send you. Observe the small red points in the twigs of this years growth. If it is the seed of this years ripening, it is well planted already. I have a good store of specimens so that if you need more pray let me know. I shall be happy to send you them

Yours truly Lucy A Millington

+ seedling plants

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Rec'd Jan 1st 1872
Ans April 9

Glens Falls Dec 18th '71

Dr George Engelmann

Dear Sir

I have read your letter with much pleasure you were right as usual in regard to the growth of the wood in which the young buds of the Staminate appear. I came near wiping them when I began to clip the shoots to pack, as the day was very dark. I am positive now that I got only female plants last summer. The first that I found were in the same place that I found them this winter but the day was so far gone that I dared not look further than on that quaking bog full of holes, that without their dense cover of twigs were dangerous. I got specimens exactly alike from two trees. That night my son (a boy of 12) was taken violently ill and I came home with him. The second day after. The specimens I got were very like the next, but legs mature

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Now what I did not tell you before
because it seemed inexplicable
and I feared that I might be wrong
is this. This winter I went to what
I believe to be the same trees that
I found the female plants on last
Summer, and I cannot see that
they bear any different plants than
the others of this winter I sent some
of them to you and you think yours
all males. Again. I went along the
edge of the wood that skirts the marsh.
about two hundred feet South, getting
plants from Eighteen trees, Large and
Small Only the snow prevented me
from exploring for a mile or two
as I wished to find female plants
as well as males if any grew there
and I was careful to get Specimens
wherever I found clusters of loose
fruit as you will see. I got plants
from trees standing alone, and in thickets
Then I went as far North to reach
the trees when I first found it in
August. I got Specimens from those
and some more not rubbish from
the sheltered spots under the trees
But that showed me nothing. only
an empty seed vessel or two to
the handful. Can it be possible that
for nearly four hundred feet there
would be males alone, or can

it be that the females appear on the same branches later perhaps from them little beads. I have tried to show you how the fruit that I saw, looked it puzzled me more than anything else. I enclose a very small fragment, all I have. Of the last finding, on the north side of a mountain. It was on a small tree, and the only one I saw, but there might have been many more only we had a very hard days work before us, and could not spare a moment, neither could we look as we went along for as you must know in mountain climbing one needs their eyes. to keep the feet in safety. I have made arangments to have plants sent me in April, May, and June which I will forward to you as soon as I recieve them After that I fear that I shall be unable to procure any unless I find them nearer home and none of the Abies are common here However I mean to look about for some on the hills around

miles away I wrote Mr Leggett that
11 Some of the plants were over an inch
in height" I recollect right some
were higher, and now and then one
several times branched or two or three
sprung from the same point on the
limb. You are very kind to explain
to me so carefully the appearances
of the plant that puzzled me so
much. I used last summer to ask
every one I met "Do you know any thing
of botany" One gentleman a Professor in a
New York college said "Oh Yes" but to my
dismay he was a book botanist. Could
not analyze a single plant so I used
to go back to my microscope in despair
after every effort! I dare say my friends
thought me this winter a mild lunatic
but botany is almost my only luxury
and I cannot afford much of that
for want of leisure. Do not think
there was any hardship in my trip
It was a day of my childhood lived
over again I was brought up in one
of the loveliest valleys of the Adirondacks
Not after walking three miles to follow
the track of deer into the fragrant
evergreen wood, when the snow was
dotted with rabbit and squirrel tracks
was like going back in the years
of my life, to the time when I played
in the snow whenever I chose.

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Rec' Jan 1st 1872

Besides I have botanized in that Swamp before, and it seemed to me a wonderful place. A profusion of the brightest and loveliest flowers is in progress always to rest colored wings all the Summer long. Some of the finest Orchis I first found there. The wonderful Lysimachia "Nummularia" and the Aroids "C palustris" and "O. aquaticum" struck me as something rare. Forgive me for gossiping so much. it is a womens habit!! Since I commenced this I have examined with a microscope all the specimens of the A. Minimum. that I have. Left They are all males. The immature plants that I got last Summer were longer at the tip & there any of those of this winter I can just the difference could be detected with the naked eye I think. provided we had them to compare.

Yours truly Mrs Lucy N Millington

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Rec'd May 30th 1872
Ans June 17

Asa Gray

Glens Falls May 26th

Dr Engelmann

Dear Sir

I received your last letter before I
saw Dr Parry. I dare say you have
heard from him before this time, and
have therefore a better agent than I
can give you. I was very glad to meet
him as I have often heard of him, and
it was a great pleasure to know that
he had botanized on this country before
us, and could understand my own interest
in it. I had made preparations to go to
Ironenesburg before he came, but was detained
by the illness of my mother. There were
several reasons why I must go just now
instead of a week or so later, so I leave
soon. I sent a large box to you by
last night mail, will be a day

in advance of this. I took time in spite of the rain to look the ground over as well as I could. I think some of the specimens I sent, (the females) are better than common. The male ~~flowers~~ or flowering plants were in some beginning to fall away. I looked for them under the trees, and found them on the ground in some considerable numbers. I did not see the two sexes on the same tree but in one case on trees that grew so near as to intertwine their branches a little. A female between two males. Still the sexes did not as I could see intermingle on the trees. There are more trees with males than females the male ~~flowers~~ plants are generaly thickest on the branches, but are not found in any numbers, in fact scarcely at all on the older wood, while the females grow sparingly much lower down On the largest Specimen that I sent you there were a few still lower

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but in separating the matted shoots I broke them off. You will see that they are some larger and a little more branched than those of later growth, at least what I suppose to be of later growth. I should say that female plants that failed to mature seed, might live one or two years longer than fruiting specimens. I do not think birds eat them. I found shells of seed vessels nowhere but on trees bearing female plants. The seeds being glutinous may adhere to the feet of birds which eat the seeds of the Spruce in the autumn and winter. The Frogs Bill lives with us all winter, subsisting on the seeds of the Conifera. I saw flocks of them of two during the winter on the evergreens in our village. What I do not understand is the positive separation of the sexes How do the young plants if they grow from seed happen to be always the same as the trees, as those of previous growth

Scarcely think two plants grow from the same base, or from old bases but two often grow very near together and they seem generally to grow very near to the right or left side of a leaf of the Spruce. I think in a few weeks more none of the flowering moules will be found on the trees. I can order more plants for you at any time but the person to whom I send is entirely ignorant of Botany though I took pains to explain the appearance of the plants and observed carefully the very trees from which to get them You were kind enough to ask how you could compensate me for my trouble I think you can understand that I botanize for my own pleasure I have never hoped to find anything new, but every plant was new to me when I found it, so that I have had great comfort in the study Still I earn with my needle, the money for my few books and my little journeys My Microscope is lent me and my friends who have both an very generous, Wherever you want me to get plants for you myself if you would pay the costs of my journeys. It would be a great satisfaction to me to do this work according to the

Rec'd May 30th 1872

best of my ability It costs me
two dollars and a half to go and
return mules I walk from the village
which I often do as I prefer to
do so almost always by choice
The country is rough but pleasant
and the walking is delightful to
one accustomed to it as I have
always been. I have explained
this because having long ago sacrificed
many small vanities to my love
of Botany I cannot now afford
to indulge in any false pride
in the matter. The cost is miserably
small, but equally miserably hard
for me to procure.

Yours respectfully
Lucy H Millington

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MISSOURI BOTANICAL GARDEN
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Saturday am yrs letter reg'd. S
fear S did not answer some of yr
questions plainly enough. S think
a few male plants do not flower
with the others but an interval of abt by
one year at least, and also the same
with females but many more of them
The plants on big arms trees are larger
than them on weak decaying trees
As to their size S think a few
that S sent last year were a trifle
larger, but perhaps it was their
being more mature. Of course
S only examined the lowest branches
and small trees. S meant to have
pulled a tree but it was too wet
The large branch S sent yr was
cut just on with above the last two
plants but they seemed to me to be on
older wood St was the last joint

Rec'd Oct. 11
Ans Dec 30

Glens Falls Oct 7th 1892

Dr George Engelmann

Dear Sir, Your Cast
Celtis was forwarded to me at Elizabethtown
in Essex Co. In that you proposed to have
plants sent you at any time from the 15th of
Sept to Oct 1st and afterwards proposed the
1st of Oct to the 15th. I had not formed them
later than Sept 7th the year before so Scarcely
not judge for myself thinking your last
suggestion might be a wise one thought
I delayed until Oct 8th which I very much
regret, as it deprives me of a great pleasure
I despair of showing you how the seed is
scattered because there was really so
little left to be scattered. The seed is
almost all gone and the plant falling
off piecemeal. Whenever I found any, it
fell in showers at the most careful
cutting or moving. I packed what I
could get in mogs in my case to bring
it home You will see the empty bases
and the remains of the plants with a
few immature seed vessels. I also sent
some male plants. Some healthy specimen
and a twig of "I balsamea." Now the
distributing of the seed is what I have
to tell you about The Capsule bursts

very much distended and is so clean that the form of the seed can be traced by holding the plant to the light. When quite ripe it seperates from its stalk and the seed is thrown from the open end at the base of the capsule with such force as to throw it several feet. The capsules are thrown from their place of course I picked a swollen seed vessel for mear examination. and while holding it very gently between my thumb and finger it exploded, and the seed hit me a smart blow in the face. I immediately thought of your writing to me last winter of an Arcicultorist on the Mediterranean coast who'd squirted the seed to some distance. I looked for others so nearly ripe They were not so plenty as I could wish. I made experiments enough to satisfy me and so that some of the people who accompanied me. I felt and heard the seeds strike the hills of my straw hat when thrown from my hand a distance of about eighteen inches Then was room enough to carry them much farther. You will find some empty capsules adhering to the handles and will see that the opening is in the base. If I had gone earlier, say the last two weeks in September as I could have done I might perhaps have got plants to you in such a condition that you could have seen for yourself As it is I have no remedy but to beg you

pardon, and to say that I think I have proved it beyond a doubt by actual experiment. I picked the seed vessel very carefully and held the base up, wards so that I could see it. I did not press it, but rolled it a little, and the discharge was so sudden and forcible as to startle me. There was no sound but the rattle of the seed on my hat or days. You will see seeds lodged on the branches in various places. As to the balsam I have looked it up and find that the cause of the large mats in its foliage is owing to the presence of a perennial fungoid parasite. It so nearly resembles the mycelium of the Aecanthobium that it is difficult to doubt it until it is actualy handled The parasite spreads through the bark by its mycellium, and comes out on the leaves in something like the grain dust. Then its spores ripen and are cast off. The bark is thick and spongy, the leaves short and swollen with a rusty pale, rigid look. It grows upward always like the Aecanthobium, never backward and the point of attack is generaly shown by a thick knot in the wood of the limb infested Some mats grow to be a large as a tunel before the branch dies with its parasite Others are as large as ones head. If you had not told me you did not study

the Dang. I should have sent you some
I found a similar spirette on wild
cherry trees. I sent you a few pen plants
from L town I had just what time my
brother spent with two little patients to
explore a marsh several miles in extent
It was high among the hills when they burn
charcoal and began at the very door of the
house when we called There were huge
fallen trees covered with the tufts of the
arcanthobrium ~~Oxycedri~~. Standing Spruces
were alive with it but I could reach
none but some poor little underground
I dined a little because I thought it
might be interesting to you at that stage
of its ~~Lifecycle~~ existence. Of course I had
very little chance to do much but I
found that the swamp was quite
dry, and rich in Orchids I should
like to go over it June and July.
I received from Dr Parry a specimen
of Arcanthobrium Americana in good
order. Thanks to you for suggesting it
I have read over your letter, and feel
confident that the plants I sent to
day will help you some though not
so much as if I had sent a little
earlier say Sept 25th. If I have over
looked any thing or have not been
explicit enough, pray tell me
so, and I will endeavor to be a
little more sensible. I fear that
I have failed to make out what

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Recd Octo 11th 72

I meant to be very clear to you
I am going to try to plant some seeds
on a neighbors spruces if I can get
permission to do so but I have not
much faith in my experiment then
By the by one of my brothers found a
tree on the mountain side with
one parasite growing on it the
thing is the tree (a small one) a
balsam fir. As he did not bring
specimens I took the liberty of
clouting it after my experiment with
the balsams. Still so far as I know
it does not grow on balsams
Mr Lowell to whom I sent some
Hieracia thinks it cannot be
Ophioglossoides as that has not
been found in the State. I believe
it is though I found it on a dry
hill or mountain, very plentiful
and always in the most arid
situations, even in the Stallowest
soils and among the Lecheas and
Selaginellas The racemes are short
crowded, and obtuse, mostly abortive
I trust that these plants will
reach you in good order
and will be any useful to
you. Whatever else I can do
for you I shall be only too glad
to do. Allow me to thank
you for your unwearied kindness

in applaning to me the difficult relations of this exceedingly difficult plant. With your help I feel that I have learned some of its habits pretty thoroughly.

Very truly yours

Wm Lamy A Millington

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This is like a drawing
I made of the last finding
Sept 7th in a dense forest
of low spines on the North
Side of a Mountain

This resembles what
I supposed to be
the seed, protruding from
the cup and which had
been kept in a glass of

wards
for many days

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M:SC EN
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St Louis March 30th 1877

Dear Sir.

Having received the nomination for the "Presidency of the Board of Public Improvements" under the New Charter, I have the honor to present myself as a candidate for the office, and respectfully solicit your vote and influence at the coming election on Tuesday the 3rd day of April.

Respectfully

Edward Walsh, Jr

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Arrenthoparin punctillum

The form of the projection of

the seed - Bracts, up (at

the same time the parent

plant, and this is cut

in fragments all over the

branches of the tree

Mrs Millington

Several new localities

Essex County

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Rec'd Oct 11th
Ans same day

Aroenthobium pusillum M S/1

Albany Oct 6th 1871

My Dear Sir

Believing you to be interested in obscure and difficult plants, I send one that I recently found growing parasitically on some young spruce trees (Abies nigra) in a marsh in the town of Sandlake, Rensselaer County N. Y. What do you call it?

Very truly Yours
Chas. H. Peck
Albany N.Y.

Dr. Geo. Engelmann
St. Louis.

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Rec'd Oct 20th

Albany, Oct. 16th 1871

My Dear Sir,

I found the Arceuthobium only on small spruce trees (Abies nigra), a half dozen of them which grow on the borders of a cold sphagnous or cranberry marsh, in the eastern part of this State, Rensselaer County. The region might be called mountainous — certainly hilly — the marsh I think is about 2000 ft. above sea level. The surrounding woods are of hemlock and spruce (A. Canadensis & A. nigra) with some intermixture of maple, beech and yellow-birch; balsam trees in the swamps. The spruce trees on which it grows are known in

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some places by the name of
"bastard spruce" having a starved
look and short leaves. The same
form occurs in the Adirondack
Mountains of the northern part
of this State and perhaps, could
any one be there at the proper
season, the Arcenthobium might
be found on them also. My specns
were collected Sept. 14th 1871.
I send a few more.

I have seen no more Juncus
maritimus, not having visited Coney
Island in two years. I gave
directions to the locality to Mr. W.
H. Leggett, a botanist of New York,
who I presume has looked after
the plant the past season.

Very truly Yours
Chas. H. Peck

P.S. None of the Arcenthobium was more than an inch high - all were simple or unbranched so far as I saw.

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

Dr. Geo. Engelmann.

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Rec'd Nov 3d
Ans — 15
— Dec 4

Albany Oct. 28th 1871

My Dear Sir,

Just before the receipt of your letter of the 18th inst. I had sent a few more specms of the Arcenthobium, but do not know if there were any male plants among them.

Being anxious to have the species determined, at least provisionally, in time for my report at the close of the year, I yesterday visited the locality again and learned one or two additional facts and collected what I think must be the male plant.

I did find two clusters, and only two, of branched specms. These grew on spruce branches a little older than the others. Asa

I send to you (in pill box). I think the branch is at least 6 years old. Most of the specns grow on branches 3 and 4 years old. I find not one on the young shoots of the present year and am inclined to think that this species germinates on older branches. I find little plants just emerging from the bark on older branches (See side branch of specn in pill box.)

The matured fruits, that were abundant the middle of September when I first found the plant, had all disappeared so that yesterday I saw none in place and only a few broken fragments adhering to the branches here and there. Whether this result is due to the raveges of insects and birds or to the regular process of nature I can not say.

The plants in pill box I suspect

are males. The little three-valved globular terminations contain three little orbicular depressed pitted bodies which I take to be authers. I send also another branch of the same style of plant but smaller.

The lower joint of the stems seems to be terete but the upper joints especially in the female and larger plants have a quadrangular tendency.

In color the plants vary from olive green to bay or chestnut color. I have seen no plant over an inch in height, and scarcely that. Most of them are not more than half an inch.

They appear to be quite abundant on a half dozen or more small scrubby spruce trees ("bastard spruce" of some localities), growing in a cold cranberry marsh in the town of Sandlake, Rensselaer County N.Y. — about 16 miles east of Albany.

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I think the altitude at least 2000 feet above the sea, perhaps a little more. I have noticed the same scrubby variety of spruce on the Adirondack Mts. at an altitude of 4000 – 5000 feet.

I hope the specimens now sent may reach you before they dry up that you may see them fresh.

Very truly Yours
Chas. H. Peck.

Dr. G. Engelmann
St. Louis

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Rec'd Dec 21
Ans Jan 26

Albany Dec. 18th 1871

My Dear Sir,

Yours of the 14th inst. at hand, I had already suspected that the Arceuthobium would be found in the Adirondacles, for I had seen the same starved-looking "bastard" spruce there which the Arceuthobium inhabits in Sandlake. I have to make my annual report to the Regents in a few days and had written in it an account of the Arceuthobium, giving essentially the same facts of its history that your letter contains and you may be assured that I am highly gratified at finding your conclusions so accurately

according with mine. I had found that in this case the seeds do not germinate on the young shoots of the present season, for in no instance have I seen a trace of the plant on such shoots. I have branches in which there is a regular gradation from the little hemispheres on twigs of the 2d year to the fruiting specms of the 4th year, — (in no case have I seen mature fruit on branches younger than this) all occurring on the consecutive internodes of the same branch.

On the other hand the only two clusters of branched specimens that I could find were on branches older, (at least 6 or 7 years old) so that occasionally the plant continues longer, or else, germinating on older branches it grows with

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greater vigor and becomes branched.
I am quite confident you
must be right in supposing the
flowers to open in Spring or early
summer, and though a visit
to the station requires a two days
journey from this place (one out,
another back) I intend to
investigate this point further the
coming spring. Your inquiry in
a former letter as to the relative
position of the male and female
plants has probably been answered
by Miss Millington's specmns. At
any rate so far as my observation
goes the two never occur on
the same branch and I think
not on the same tree, but of
this I am not quite positive, but
will settle it in my next visit
to the locality. I have drawn
up a figure of the plant so

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far as it goes and a description under the name Arceuthobium pusillum which seemed to me preferable to "minutulum" which you somewhat hesitatingly proposed. This however is merely provisional as I had to report it under some name if not quite the best in the world. I suppose the report will not be printed before next summer so that there will be abundant time for additions and corrections if necessary.

Very truly Yours

Chas. H. Peck

Dr. G. Engelmann

St Louis.

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Arceuthobium

Arceuthobium pusillum, Peck July 18' 1892.

collected with a Worker by Miss McKington

July — and sent here fresh in mail.

The annual ring of the Spruce for this year is fully formed, so that in the plant that has flowered in May and is going to fruit in Sept. ~~is~~ found on a Branchlet with 4 annual rings

Wood cells 0.013 – 0.015 mm diam. } Abies magn
Bark cells 0.030 – 0.050 mm diam }

Parenchyma cells of Arceuthobium, base of stem 0.030 diam
Cells of those parts creeping through the bark 0.018–0.021 "

These cells are easily distinguished in the tissue of the bark, from the bark cells, by their much smaller size, their yellowish colour and strong refracting properties so that they look almost like oil drops — and their great density.

They are found within the bark tissue, without apparently any connection with the cambium system underneath — more or less between that and the Epidermis, round things of these small & dense cells, without any sheath or epidermis, right between and joining the bark tissue. — No vertical vascular* nor any epidermis seen. —

* seem one, similar to the one described below

A vertical bundle of vessels seen in the parasite near its base, within the bark, consisting of some elongated cells, 2–3 times as long as wide.

In the sketches made today is:

a the pith of the Spruce
b the wood
c cambium
d bast cells
e e. bark parenchyma

f ducts
g Arceuthobium cells spreading through bark
h — lower part of parasite, hid in the bark
i — upper part, yet hid.
k — lower part of stem
l. — central bundle of elongated cells in the lowest part.

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